NYSERDA / DOE Joint Storage Initiative (NYSERDA Publications)

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REPORT NO.	TITLE	AUTHOR(S)	DATE
NYSERDA/DOE2008-2	**Grid Frequency Regulation by Recycling Electrical Energy in Flywheels**	Joseph Sayer & Jim Arsenaux	Jul-08

Abstract: Beacon Power has developed and applied for patent coverage for an innovative means to provide frequency regulation with the use of flywheel energy storage, rather than by cycling the output of a generator. The intent of the regulation service is to add and subtract power (as directed by the Regional Transmission Operator), but to have a net zero output. The system recycles energy (stores energy when generation exceeds loads; discharges energy when load exceeds generation), instead of trying to constantly adjust generator output. This cyclic characteristic of regulation services makes a flywheel energy storage system uniquely suited to the application. The system was developed in close cooperation with several ISOs (independent system operators), including the NYISO. It can perform as many cycles as required, with no impact on its performance. A prototype was built and then tested for eight months to follow various regulation signals and demonstrate its reliability, including its ability to provide reactive power to the grid. The system can follow a rapidly changing signal and go from full power in one direction to full power in the other direction in less than four seconds.

NYSERDA/DOE2007-1	**Guide to Estimating Benefits and Market Potential for Electricity Storage in New York (With Emphasis on New Your City)**	Joseph Sayer & Jim Eyer	Mar-07

Abstract: Storage allows for superior management of electricity supply and delivery cost and risk. Storage also enables other compelling electric resource options, including demand management and renewable energy. In addition, storage can increase fuel diversity, reduce overall fuel consumption and cost, and reduce air emissions. This document describes a high level, technology-neutral framework for assessing potential financial benefits from and maximum market potential for electricL energy storage. More specifically, it addresses electric, utility-related applications in New York, with an emphasis on New York City (NYC) – designated as Zone J by the New York Independent System Operator (NYISO). Electricity storage holds great promise to make the New York power system more competitive, stable and secure.